



# Counter Explosive Hazard Update



**We Owe  
Them The  
Best!**



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# Agenda

- **Explosive Hazards Progression**
- **Operating Environment**
- **Threat Update**
- **IED Statistics**
- **Lessons (Re) Learned → Hard Truth**
- **CEHC Overview**
  - Mission, Intent
  - Organization
  - Accomplishments
  - Current Actions
- **Way Ahead → Detect and Neutralize**



# Explosive Hazards Progression

DETECT



Mine detecting teams  
Europe - 1944

**BOOBY TRAPS**



Probing for mines  
Vietnam - 1965

**MINES**



AN/PSS 12

**MINES**



HSTAMIDS

**UXO**

NEUTRALIZE



TRACK-WIDTH ROLLERS



Lifting a German  
anti-tank mine - 1944

**MINES**



Dismounts



Rocket-propelled  
line charge  
composed  
of detonation cord -



MICLIC



Battalion Countermine  
Set

**UXO**

**BOOBY TRAPS**

**IEDS**



Anti-Personnel  
Obstacle  
Breaching  
System

(1940s)

(1950s)

(1960-70s)

(1970s-80s)

(1990s)

(2000s)

WWII

KOREA

VIETNAM

COLD WAR

DESERT STORM  
SOMALIA

AFGHANISTAN

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~~BOSNIA  
KOSOVO~~

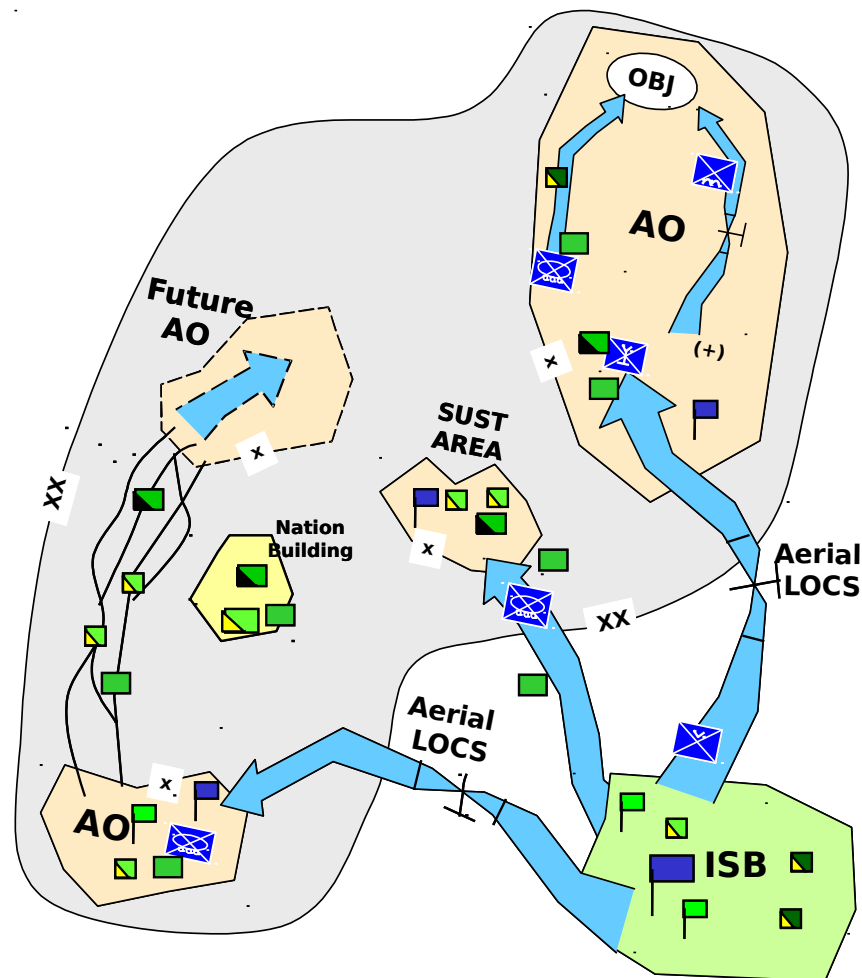
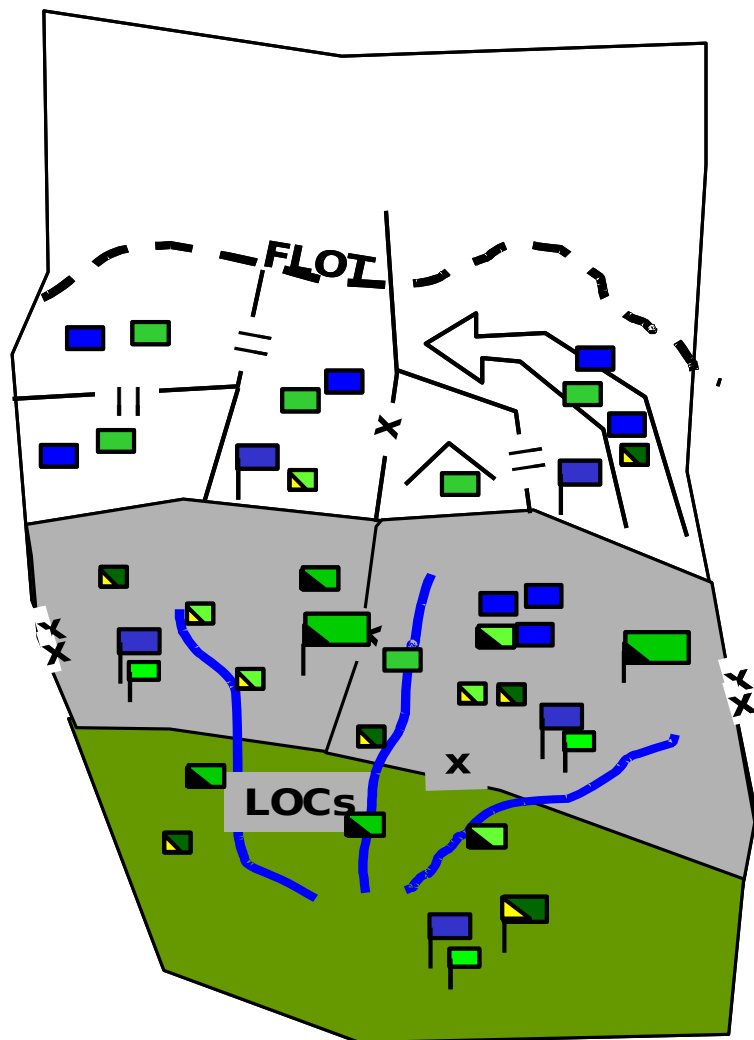
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# Operational Environment

In the Past

Today...



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# Threat Operational Concepts



- Small unit actions such as raids, ambushes & improvised explosive devices to induce casualties over time
- Fight dispersed; Use cover & concealment, mask by terrain, sanctuaries and non-combatants; Don't be targetable
- Each engagement is different, no standard doctrine (factional differences), difficult to establish patterns
- Enemy adapts their concepts and TTPs in response to coalition force changing concepts / TTPs
- Prevent sanctuary for enemy forces, anytime, anywhere
- Cumulative effects of integrated small unit actions – connected C4ISR

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# Threat TTPs

- **Improvised Explosive Devices**

- Command Detonated
  - Remotely Activated (e.g. initiated by cellular phone)
  - Hard Wired (e.g. initiated by mechanical detonator)
  - Suicide Bombings (Individual and Vehicle Borne IEDs)
- Pressure / Trip Wire
  - Manufactured Mines / Conventional Mines
  - Booby Traps, some improvised
- Mechanical Timers

- **Tactics**

- Focus on low threat convoys and/or vulnerable vehicles
- Tactics improved to combining IEDs, RPGs, and small arms
- Planning of attacks compartmentalized and developed over several days
- Have shown the tendency to be opportunistic

- **Availability of Ammo, Explosives, and Detonating Devices**

- Thousands of tons of ammo and explosives located throughout the country.
- RC devices are available off the shelf.





# Threat TTPs---Exploit Predictability



M113 Destroyed by mine. Threat identified routine stationing of the LP/OP and prepared the ambush.

M1 Destroyed by IED. Threat identified routine movement on Route and prepared the ambush.







# Threat TTPs - Urban Environment



IED placed in curb on edge of road.  
Intent is to ambush Coalition convoys moving in the right lane per SOP.



Threat reaction to Coalition convoys moving in left lane versus right lane. Placed IED in median to counter our new procedures.



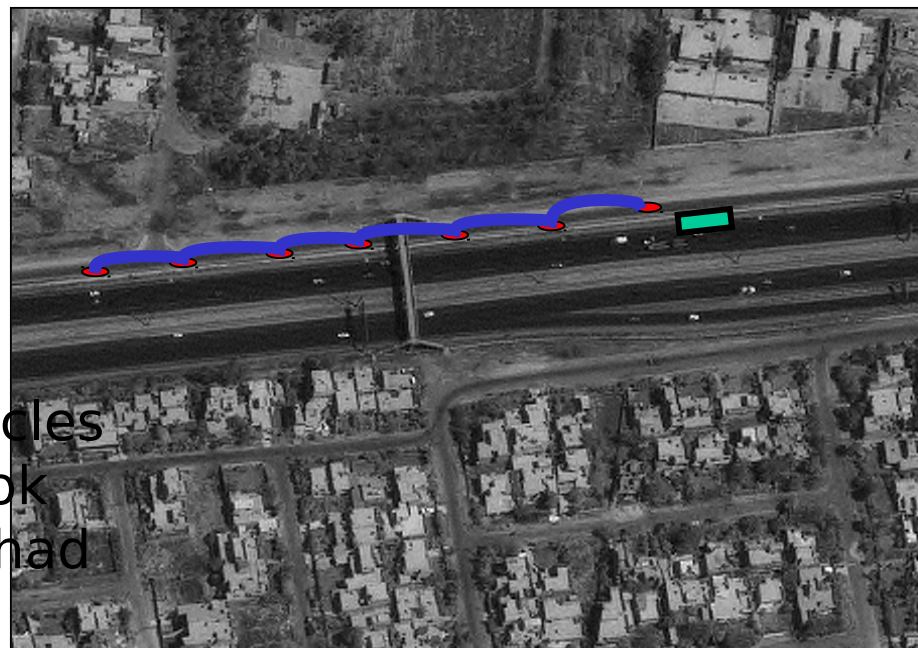


# Threat TTPs - Urban Environment



IED placed along far side of curb on the exit ramp where vehicles must slow down to exit. Easily concealed and quickly emplaced.

Series of IEDs placed along road with disabled vehicle to slow vehicles down and increase time in EA. Took time to set up which meant they had plenty of time to construct.





# Threat TTPs - Rural Environment



In this case the IEDs were placed on both shoulders and the median to support an attack on Friendly Forces moving in either direction or highway lane.

Artillery rounds initiated by remote detonation system. separate RCIED for each shoulder and median.





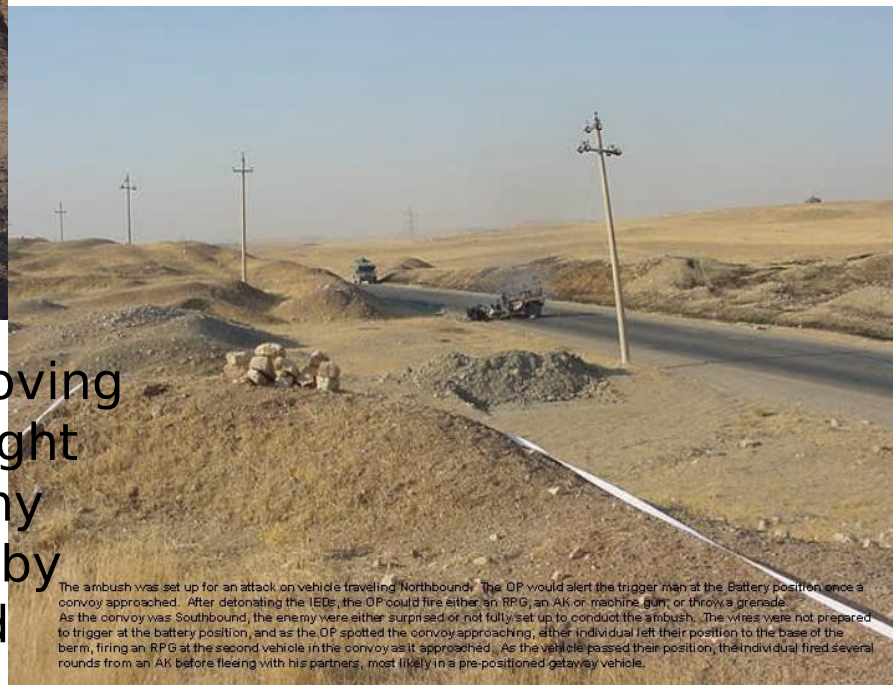


# Threat TTPs - Rural Environment



IED placed in the middle of the road in a wash out. Not a restricted route but the terrain Does afford good concealment for Initiation Point.

Ambush set up to catch convoy moving Left to right. Convoy came from right To left before ambush ready. Enemy Showed they can be opportunistic by Engaging with RPG destroying lead Vehicle. Note CP and Aim Point.



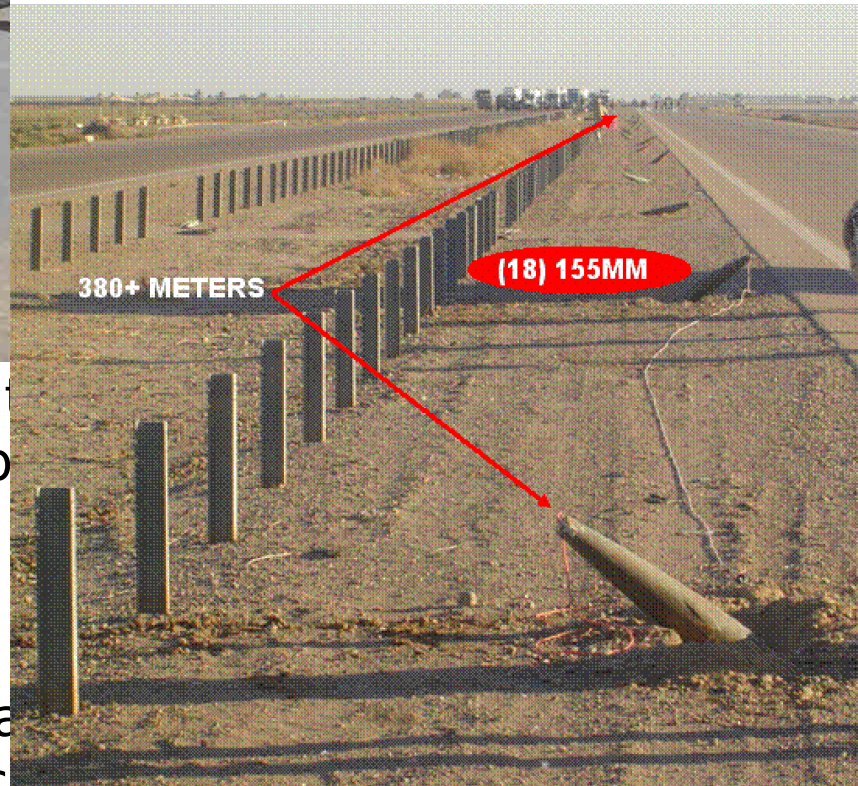
The ambush was set up for an attack on vehicle traveling Northbound. The OP would alert the trigger man at the Battery position once a convoy approached. After detonating the IEDs, the OP could fire either an RPG, an AK or machine gun, or throw a grenade. As the convoy was Southbound, the enemy were either surprised or not fully set up to conduct the ambush. The wires were not prepared to trigger at the battery position, and as the OP spotted the convoy approaching, either individual left their position to the base of the berm, firing an RPG at the second vehicle in the convoy as it approached. As the vehicle passed their position, the individual fired several rounds from an AK before fleeing with his partners, most likely in a pre-positioned getaway vehicle.



# Threat TTPs - Rural Environment



IED dug into the shoulder of the road. Notice there is no restricted terrain. Initiated from tall vegetation about 100 meters away. Note the poles which could be used for aim points.



IEDs placed along the median that covers an engagement area of about 400 meters. Again, there is no restricted terrain, but the enemy probably used knowledge of the target's habits to attack. These are impossible to see in moving vehicles.

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# Explosive Hazard Casualties

**Operational Period: 1 May 03 - 05 Mar 04**

	US		Coaliton (non-US)	
	WIA	KIA	WIA	KIA
<b>Mine</b>	70	4	4	1
<b>UXO</b>	31	4	3	0
<b>IED</b>	1082	101	63	27
<b>Submunitions</b>	8	2	0	0
<b>Total</b>	1191	111	70	28
<b>Total WIA:</b>	<b>1261</b>	<b>Total KIA:</b>	<b>139</b>	

**Primary  
Capability  
Shortfalls**

- 1. Detection - Locating explosive hazards at a standoff distance**
- 2. Neutralize - Neutralize explosive hazards at a stand**
- 3. Prevent - Stop the initiation of explosive hazards**
- 4. Protect - Personnel and vehicle capability to withstand blast explosive hazards.**
- 5. Education - Basic Awareness and individual countermine skill training needed to increase personnel understanding of COE**



# IED Rollup and Analysis

	Total IEDs Found	#IEDs Found Discovered	#IEDs Detonated, w/ WIA/KIA	#IEDs Detonated, No Injury
<b>Benchmark</b> Numbers and Percentages, Nov 03	2483	1062	477	944
	100.00%	42.77%	19.21%	38.02%
Current Numbers and Percentages 05 Mar 04	4138	1966	688	1484
	100.00%	47.51%	16.63%	35.86%
Analysis		4.74%	-2.58%	-2.16%

1. Clear indications that the following actions are having positive impacts.
  - a. Individual and Leader awareness training improving personnel ability to plan and operate safely in explosive hazards environment. Developing Explosive Hazard Training teams that are capable of updating and sharing current operational conditions to deployed personnel, as seen by the MEOICC EHAT team, are improving our ability to defeat or impede threat IED attacks.
  - b. Accelerated development of acquisition program and COTS CM equipment significantly improving prediction (TMFDB), detection (IVMMD), prevention (Jammers), and protection (Buffalo, uparmor kits) capabilities.
2. Comparison clearly shows that sustaining the CM development process and maintaining a contingency capability to educate and rapidly provide critical CM requirements to the Force could significantly reduce the Threat's ability to effectively use explosive hazards at the onset of hostilities.

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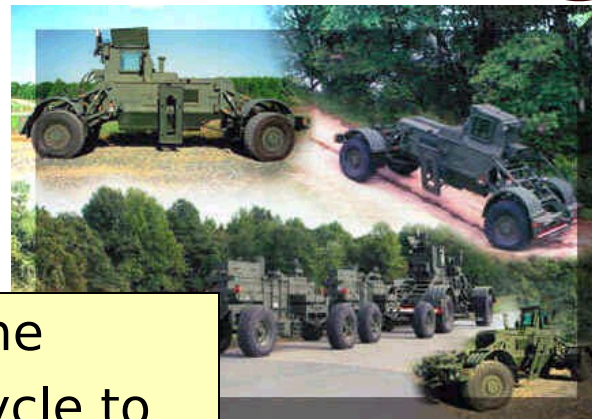
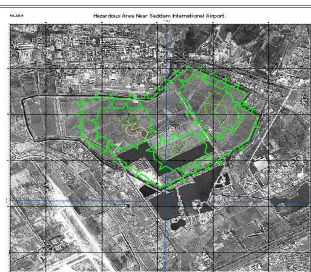


# Lessons Learned

- Must sustain the countermine effort! Technologically challenging mission that requires an enduring effort. Cannot continue to wait until a crisis to surge efforts.
- Can no longer just be content with mine rollers, plows, and handheld mine detectors. The explosive hazards we face require more than brute force to overcome.
- Must establish an enduring countermine center of excellence!



# Lessons



- S&T community has broken the development and acquisition cycle to rapidly develop, test, field , and train critical countermine systems.
- Coalition partnerships from the military through industry enable “Good Ideas” to be shared and exploited.



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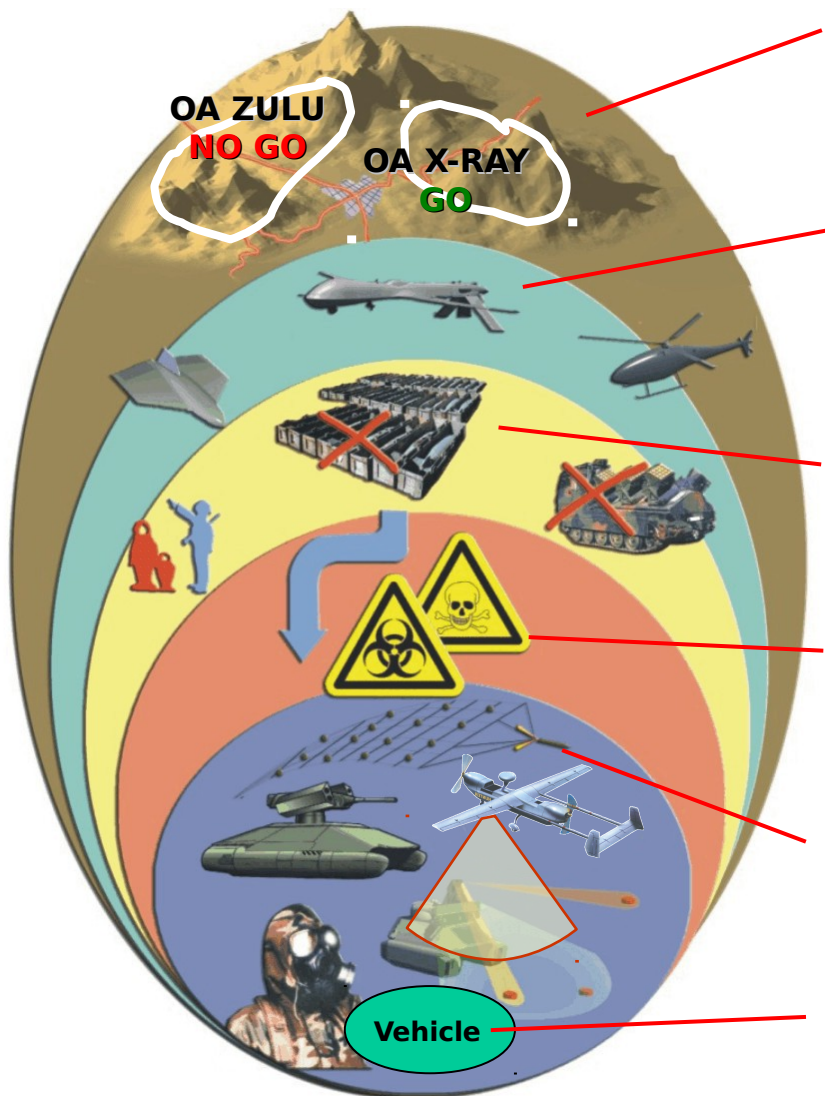


# CEHC Mission

Synchronize and integrate counter explosive hazard (Mines, UXO, IEDs, Booby Traps) solutions, concepts, technology, and materiel across the DOTMLPF spectrum to support assured mobility; protect the force; defeat mine and explosive hazards in the contemporary operational environment; and ensure we maintain a superiority in all facets of counter explosive hazard warfare.



# Tenets of Assured Mobility



- **PREDICT** actions and circumstances that could affect the ability of the force to maintain momentum
- Use ISR assets to **DETECT (Early)** indicators of impediments or lack of impediments to battlefield mobility early; identify alternatives and establish surveillance
- Act early to **PREVENT** potential impediments to maneuver from affecting battlefield mobility of the force
- If prevention fails, **Detect** impediments, identify alternatives and **AVOID** detected impediments to battlefield mobility of the force
- **NEUTRALIZE**, reduce, or overcome (breach) impediments to battlefield mobility that cannot be prevented or avoided

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- **PROTECT** vehicles against effects

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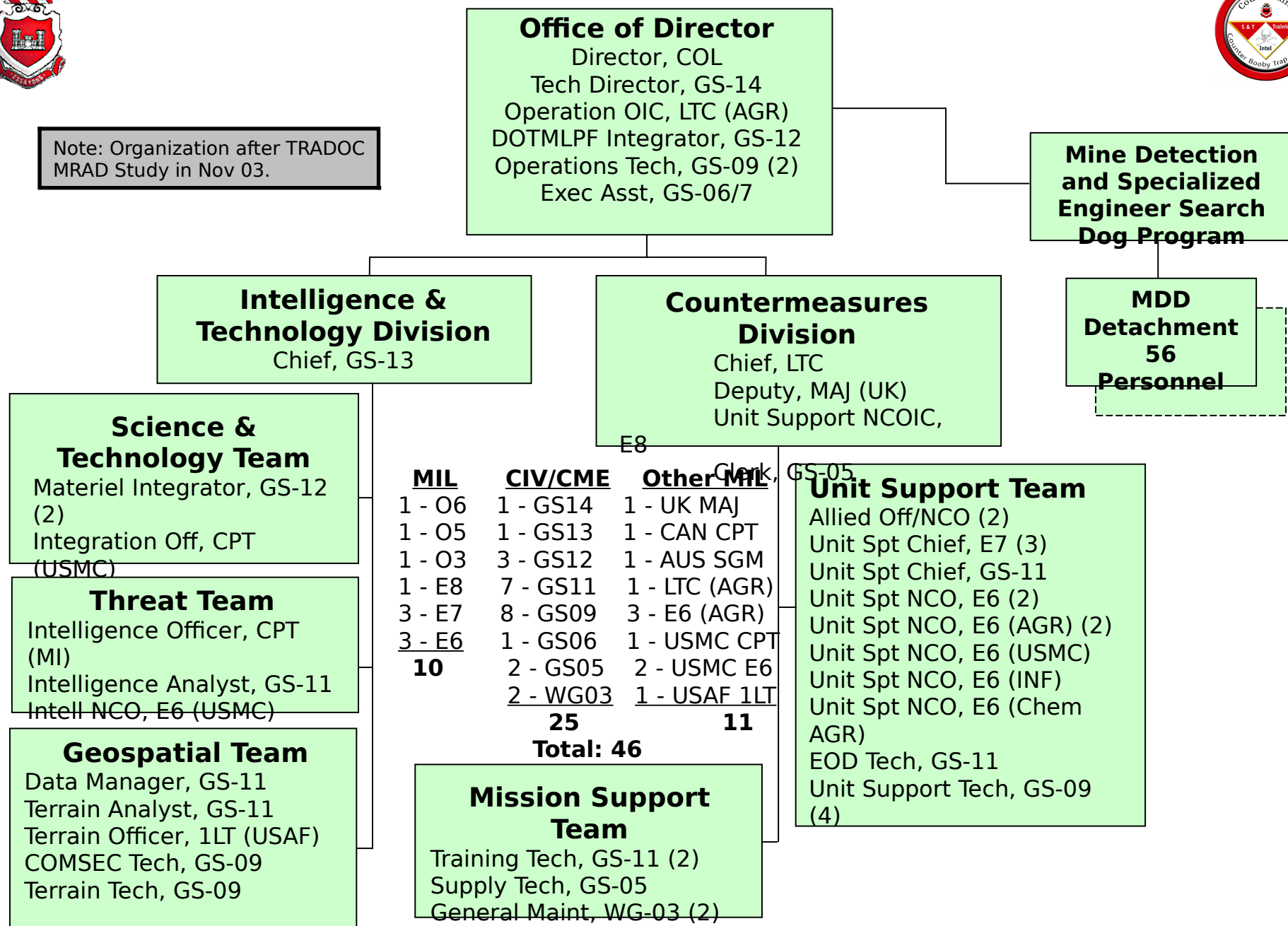


# Intent

1. To provide the nation with a **single proponent** for contingency counter explosive hazard stewardship considerations. CEHC will develop **integrated** approaches to counter explosive hazard DOTMLPF development in support of contingency and future force objectives.
2. To achieve unparalleled credibility as **the** counter explosive hazard authority in all areas of doctrine, organization, training, materiel, leadership development, personnel and facilities for contingency and future operations.
3. Center will rapidly find, develop, test, train, field, and integrate counter explosive hazard solutions across the DOTMLPF for contingency operations and identified critical capability shortfalls to support Training the Regiment and Taking Care of the Regiment.



Note: Organization after TRADOC  
MRAD Study in Nov 03.



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# CEHC

## Operational Relationships

### Field

10 Divisions  
2 Corps  
2 JTF HQs  
8000 Soldiers Trained

### DOD / Joint Integration

USMC  
NAVEODTECH CTR  
NAT'L Gnd Intel Ctr  
Air Force

### Combined Arms

EOD School  
Infantry School  
JFC Special Warfare  
ICTs

**CEHC**

### Allied/Int'l

2 EOs  
UK  
Canada  
Australia  
France  
Germany  
Israel  
Columbia  
South Africa  
Turkey

### Other

DA G3 IED TF  
S&T CMTF  
PM-CCS  
CTCs  
INSCOM  
JUXOCO  
NVESL  
NIMA  
REF  
TEC

### MANSCEN

USAES  
1<sup>st</sup> Bde  
TSM  
DCD  
MSBL

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# Budget Info



Item	FY 04	FY 05	FY06	FY07	FY 08	FY 09
Civ labor	\$0.2M	\$1.2M	\$1.8 M	\$1.8 M	\$1.9 M	\$2.0 M
Contract	\$0.4M	\$3.7M	\$0.9 M	\$0.9 M	\$0.9 M	\$1.0 M
Travel	\$0.9M	\$1.1M	\$0.5 M	\$0.5 M	\$0.5 M	\$0.5 M
S&E	\$1.3M	\$4.6M	\$5.6 M	\$5.6 M	\$5.6 M	\$5.6 M
Total	\$2.80 M	\$10.6 M	\$8.69 M	\$8.79 M	\$8.90 M	\$9.00 M



# Intelligence Achievements

1. Coordinated the rapid development and fielding of the Theater Minefield Database (TMFDB) to track explosive hazards and conduct threat analysis to support operations in OEF / OIF.
2. Developed, resourced, and executed the training for two Mines and Explosive Ordnance Information Coordination Cells (MEOICC). The MEOICC provides the command and control for tracking and analyzing explosive hazards across the theater of operations. This organization coordinates and support respective Mine Action Authorities and Non-governmental Organizations supporting theater operations.
3. Developed a complete situational awareness of threat capabilities throughout the theaters of operation utilizing U.S. and Allied intelligence systems. Developed countermeasures against threat TTPs.
4. Maintains current database of explosive hazards for analysis and development of countermine solutions.
5. Developed and coordinated the publication of four theater specific countermine handbooks to support



# Science and Technology Achievements

1. Developed and implemented training programs for countermine systems fielded to OEF and OIF.
  - a. Berm Sifter → Used to clear antipersonnel mines in OEF
  - b. Matilda Robot → Used to remotely inspect caves, houses, and explosive hazards.
2. Working with multiple agencies to develop prediction, detection, prevention, neutralization, and protection capabilities to enable the commander to maneuver and protect Soldiers.
  - a. Conducted forward deployments to capture theater operating environment conditions to ensure developmental efforts are focused on the correct conditions
  - b. Maintained close contact with all involved agencies and provided guidance as to developmental directions and the current Threat TTPs and environment.
  - c. Supporting the development and testing of multiple detection and neutralization systems that utilize commercial off the shelf and future military technology.
3. Coordinated TTP development, training support, and logistical support for contingency fielding of countermine systems

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# Training Achievements

1. Developed and implemented critical mobile countermine awareness and tactical training for active and reserve units deploying into high threat theaters of operation.
2. Developed and trained the Handheld Standoff Mine Detection System (HSTAMIDS) as part of the rapid fielding to support OEF/OIF.
3. Conducted training for over 8000 military personnel and civilians to include all active divisions from Jan 03 to Jan 04.
4. Reviewed and updated doctrinal manuals to reflect best practices conducting route and area explosive hazards clearance operations.
5. Forward deployed into OEF/OIF to train military personnel and develop TTPs in conjunction with forces in Theater.
  - a. Route Clearance → Developed in conjunction with CJTF 7 forces.
  - b. Area Clearance → Developed TTPs in conjunction with CJTF 180 forces.



# Current Actions

1 of 2



- Staffing CEHC Concept plan for DA G3 approval
  - TRADOC Manpower Survey validated 46 personnel; consists of joint and multinational positions
  - CEHC Facility approved for FY 07 construction; currently being staffed for FY 05 funding
  - Resourced through FY 11 POM
  - Will provide maneuver commanders with an enduring organization, focused on counter explosive hazard issues, that is effective and responsive
- Working to establish USAES as the proponent for explosive hazards applied to Assured Mobility; will provide joint and multinational maneuver commanders with a single proponent to address explosive hazard requirements
- Developing concept to train skill sets for search operations across the Force; provides the maneuver commander an additional capability to cordon off and systematically search for explosive hazards



# Current Actions

2 of 2



- Developing concept to train battlefield munitions disposal skill sets to engineers; will increase maneuver commanders capability to minimize UXO and munition hazards on the battlefield
- Establishing a consolidated countermine materiel coordination site to share developmental actions, reduce redundant efforts, and provide maneuver commanders with a single proponent for countermine materiel requirements; currently have matrixed countermine quad charts on SIPR website and utilized by JUXOCO and provided to DA G3 IED TF; enables rapid DOTMLPF integration and fielding of explosive hazard solutions
- Developing three mobile training teams capable of deploying to any location and providing critical countermine awareness, TTP, and equipment training
- Coordinating the establishment of countermine equipment training site at Fort Leonard Wood to prepare operators and leaders for deployment; will reduce the in-theater train-up and provide maneuver commanders with Forces ready to conduct countermine operations



# Where To Go?

## Given Our Shortfalls

1. The Best Minds
2. Sustained Resources
3. Focused Effort

Way Ahead

## REQUIRED CAPABILITIES

- Predict
- Detect
- Prevent
- Avoid
- Neutralize
- Protect





# Matériel Solution Requirements

1. Capability to **SEE** deep in order to maintain a watchful presence in the AO and **PREDICT** Threat actions
2. Capability to **DETECT** and **NEUTRALIZE** explosive devices, especially command detonated, before driving over, through, or by them
3. Improved **PROTECTION** for Soldiers and vehicles. **PREVENT** or reduce the effects of explosive devices



# Constraints

1. Solutions cannot require significant soldier support
2. Cannot field new materiel without adequate training and logistical support packages (operator validation during and after fielding, mechanic training, DS / GS / depot support must be responsive)
3. Need help now versus waiting for the 100% solution



# Way Ahead

1 of 5



## Materiel Requirement #1: See and Predict

### 1. Operational Requirement.

- a. Maintain a presence throughout Area of Operations
- b. Maintain control of the Area of Operations
- c. Predict Threat actions and patterns

### 2. Focus efforts to

- a. Integrate sensors across the battlefield; systems of sensors airborne and ground mounted
- b. Create a common C2 interface to share information at all levels to include Joint and Multi-National Forces

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- c. Integrate TMFDB with MCS-FNG into Single



# Way Ahead

2 of 5



## 1. Operational Requirement: **Detect Explosive Hazards**

- a. Standoff Detection – Outside blast radius of hazard
  - 1) Surface Laid
  - 2) Buried up to 12 inches
  - 3) Encased in concrete/masonry, perhaps reinforced
  - 4) Carried by a person or vehicle
- b. Detect while moving at least 50 km/hr

## 2. Focus on detection of explosive hazards that are

- a. Metallic
- b. Non-metallic
- c. Explosive Material
- d. Cellular (Receiver/Transmitter) Activated
- e. Garage Door/Key Entry (Receiver) Activated
- f. Wire Activated





# Way Ahead

## 3 of 5

### 1. Operational Requirement: **Neutralize Explosive Hazards**

- a. Standoff Neutralization – Outside blast radius of hazard
  - 1) Surface Laid
  - 2) Buried up to 12 inches
  - 3) Encased in concrete/masonry, perhaps reinforced
  - 4) Carried by a person or vehicle
- b. Neutralize without collateral damage

### 2. Focus neutralization efforts on

- a. Explosive Material
- b. Blast Initiators
- c. Electronic detonators
- d. Vehicle lane clearance
- e. Route and area clearance
- f. Integration of Engineer, SOF, EOD, Joint and Multinational Capabilities



# Way Ahead

4 of 5



## Materiel Requirement #3: Protect and Prevent

### 1. Operational Requirements.

- a. Active and passive mine resistant systems to survive mine strikes and preserve combat power
- b. Active and physical expedient hazard marking systems to avoid bypassed and known explosive hazards

### 2. Focus protection efforts on

- a. Standoff detection of explosive hazards
- b. Improved Soldier protective equipment
- c. Development of mine resistant vehicles (MRV)
- d. Education → Explosive Hazard Awareness Training
- e. TTPs → Movement Procedures, Risk Assessment and Mission Analysis
- f. TTPs → System of Systems Approach; Route Clearance; Combat Patrols; Sensors; HUMINT
- g. Standard Marking Systems



# Way Ahead

5 of 5



## Materiel Requirement #3: Protect and Prevent

### 1. Operational Requirements.

- a. Prevent the Threat from constructing obstacle and/or explosive systems
- b. Prevent the initiation of explosive hazards through maneuver or countermeasures

### 2. Focus prevention efforts on

- a. Prediction of Threat actions
- b. Standoff detection of explosive hazards
- c. Detection of RCIED frequencies to improve jammer capability
- d. Education → Explosive Hazard Awareness Training
- e. TTPs → Movement Procedures, Risk Assessment and Mission Analysis



# System Capabilities

## 1 of 2



RE F #	System	OEF O/H	OIF O/H	Predic t	Detec t (Far)	Detec t (Near )	Preven t	Neutraliz e (Far)	Neutraliz e (Near)	Protec t
1	Tactical Minefield Database (IMFDB)	3	9	X						
2	IVMMD	3	6			X			X	X
3	Meerkat, IVMMD					X				X
4	Husky, IVMMD					X				X
5	HSTAMIDS / AN/PSS-14	29	115			X				
6	F1A4 Minelab	20	119			X				
7	Mine Dogs	7				X				
8	GSTAMIDS		2		X					X
9	Buffalo, Heavy MPV	3	7							X
10	RG 31, Medium MPV	2	2							X

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# System Capabilities

## 2 of 2



RE F #	System	OEF O/H	OIF O/H	Predict	Detect (Far)	Detect (Near)	Prevent	Neutralize (Far)	Neutralize (Near)	Protect
11	Matilda, Robotic	2	7		X					X
12	MCAP, D7 Uparmored	4	7							X
13	D9R, Uparmored	7	11							X
14	Mini-Flail	6	2					X		
15	Panther II		2					X	X	X
16	SESP Jammer						X			X
17	Change Detection (T)				X					
18	Aardvark, Medium Flail	2							X	X
19	Hydrema, Medium Flail	3							X	X
20	Berm Sifter, MW24CX	2							X	X



# Counter Explosive Hazard Update



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**MSG Michael Bergeron  
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